Positioning Paper

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Natural disaster preparation and response: a guide for state housing authorities

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ACRONYMS

ABI	Association of British Insurers (UK)
ABS	Australian Bureau of Statistics
AGO	Australian Greenhouse Office
AHURI	Australian Housing and Urban Research Institute
AS/NZS	Australian Standards / New Zealand Standards
AusDIN	Australian Disaster Information Network
BoM	Bureau of Meteorology
BTE	Bureau of Transport Economics
BTRE	Bureau of Transport and Regional Economics
COAG	Council of Australian Governments
COMDISPLAN	Commonwealth Government Disaster Response Plan
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DFC	Department for Families and Communities, South Australia
DHS	Department of Human Services, Victoria
DHHS	Department of Health and Human Services, Tasmania
DHW	Department of Housing and Works, Western Australia
DISPLAN	State Disaster Plan
DLGHS	Department of Local Government, Housing and Sport, Northern Territory
EMA	Emergency Management Australia
ENSO	El Niño Southern Oscillation
EU	European Union
FEMA	Federal Emergency Management Agency (US)
FESA	Fire and Emergency Services Authority, Western Australia
GA	Geoscience Australia
GIS	Geographic Information Systems
HNSW	Housing New South Wales
HUD	Housing and Urban Development, Department of (US)
IAG	Insurance Australia Group
ICA	Insurance Council of Australia
IDRO	Insurance Disaster Response Organisation
IPCC	Intergovernmental Panel on Climate Change
NDRP	Natural Disaster Response Plan
NDRRA	National Disaster Relief and Recovery Arrangements
NEMCC	National Emergency Management Coordination Centre

NFF	National Flood Forum (UK)
NGO	Non-Government Organisation
NHQ	Natural Hazards Quarterly
NTES	Northern Territory Emergency Services
OoH	Office of Housing, Victoria
SCC	Sheffield City Council (UK)
SEMC	State Emergency Management Committee, Western Australia
SES	State Emergency Service
SHA	State Housing Authority
UN/IATFDR	UN Inter-Agency Task Force on Disaster Reduction
UN/ISDR	UN International Strategy for Disaster Reduction
UN/EPFI	UN Environment Program Finance Initiatives
WMO	World Meteorological Organization

EXECUTIVE SUMMARY

A natural disaster is a rapid onset event that threatens or causes death, injury or damage to property or the environment, requiring a coordinated multi-agency and community response. It can include a bushfire, earthquake, flood, storm, cyclone, storm surge, landslide, tsunami, meteorite strike and/or a tornado.

Natural disasters have huge impacts on individual households and communities which extend to regions and the nation. Their significance varies by type between each state and territory but floods, severe storms and tropical cyclones are the most costly, and bushfires cause the most deaths and injuries. The most comprehensive data available indicates that in the period 1967-1999 the total annual economic cost to Australia from natural disasters exceeded $1.14 billion (BTE, 2001).

In key government reports, natural disasters are defined as those events with costs exceeding $10 million, and in the period 1967-1999 they occurred on average eight times each year (BTE, 2001; COAG, 2004). However, there are many other, smaller but still devastating events, described here as environmental emergencies. Together, natural disasters and environmental emergencies occur on average more than 50 times each year (Blong, 2005).

Population growth, demographic structure, and internal migration to high-risk locations (coastal areas and the urban fringe) are placing more people at risk of disaster in Australia. The predicted effects of climate change also suggest that there will be more frequent and/or intense weather events in Australia such as severe storms and tropical cyclones. Warmer and drier weather could result in greater bushfire risks with longer seasons, while sea level rise is likely to be linked to coastal erosion and flooding of infrastructure, especially when coupled with intense rainfall episodes and storm surges. Many communities that, up until now, have been relatively unaffected may in the future be affected adversely unless better prepared.

The most costly and significant impacts of natural disasters and other environmental emergencies are on buildings. Damage or total loss of residential dwellings and social infrastructure especially accentuate hardship, homelessness, displacement and psychological trauma. For this reason, State Housing Authorities (SHAs) are among the key stakeholders with significant roles in disaster management.

International policy and practice in disaster management advances an all-hazards, multi-agency approach, including working with communities in mitigation, preparedness, response and recovery. The vulnerability of individuals and communities relates to socio-economic and demographic factors, the geography and quality of the built environment, as well as the exposure to a natural hazard. However, the resilience of individuals and communities can be increased by using better disaster management systems. These include risk-assessment protocols, land-use planning, building codes and new technologies such as early warning systems and geographic information systems (GIS).

The cases of hurricane Katrina in the US, summer floods in the UK, and the Hanshin earthquake in Japan all illustrate the profound impacts of natural disasters and the types of housing issues that can ensue. In particular, this means damage to housing that results in large numbers of evacuees needing emergency shelter and then temporary and ultimately permanent accommodation. Preparations can underestimate the complexity of the tasks ahead and the risks that certain forms of intervention can accentuate existing social inequalities.

To learn from overseas disasters requires some caution with the interpretation of data and an assessment of their use for developing effective policy. With this in mind, housing and natural disaster research mostly from the US, but also elsewhere, helps to identify specific issues that emerge and require attention. First, successful disaster management requires coordination and communication across all levels of government; and the involvement of communities and stakeholders such as planners, developers and the construction and insurance sectors. Second, there is a need for understanding both the processes behind emergency sheltering, evacuation and housing provision and the socio-economic and political influences on the shift from initial responses to full recovery. In short, best practice requires broad, political mobilisation and resources rather than a reliance on abstract planning protocols.

In Australia, disaster management involves all three tiers of government. The Commonwealth Government has an overall coordinating role, through the Commonwealth Government Disaster Response Plan (COMDISPLAN) and its key agency, Emergency Management Australia (EMA), providing financial resources and operational assistance in mitigation, response and recovery. The states and territories are responsible under legislation for establishing their own disaster and emergency management structures. In addition to providing warning systems, education and planning as well as response and recovery, they give support and direction to local government agencies working in the immediate vicinity of a disaster.

State and territory governments in Australia have their own strategies, policies and practices for disaster management with links to their respective State Emergency Services (SES) as well as police and fire departments. Different committees and councils are appointed and headed by senior officials such as the Premier, Chief-of-Police or a department executive. Their activities are coordinated through and undertaken at the state or territory, regional, district, local and community levels in conjunction with other agencies and organisations.

State housing authorities (SHAs) have roles in the provision of emergency shelter and accommodation, material aid and financial and other support to communities (for example, in evacuation or with transport). Their remit usually includes communicating information and providing assistance to public housing tenants and private renters or, in some situations, to a wider spectrum of households. Variation in responsibilities and activities are often due to how the SHA is positioned in relation to other state departments and their functions, such as public works, construction and maintenance.

SHAs have critical roles in disaster management that link all levels of government, their agencies and other organisations, and extending to the wider community. They all engage in planning and preparation, and provide response and recovery measures during disasters as appropriate. However, a fuller understanding of their roles and responsibilities and actual experiences in coping with such events can facilitate improved policy and practice in the management of natural disasters and other environmental emergencies.

1 INTRODUCTION

This Positioning Paper is the first publication from a research project that examines how SHAs in the various Australian states and territories prepare for and respond to natural disasters and other environmental emergencies. Section 1 introduces the research project by describing its overall aim and specific objectives. It also provides a context for the research by setting out the incidence and impacts of natural disasters and other environmental emergencies in Australia, the roles of population and demography, climate and climate change, and key housing stakeholders. Section 2 reviews the international literature on disaster management, uses three case studies to illustrate the housing issues that can arise, and notes the possible lessons learned for Australian policy and practice. Section 3 summarises the arrangements that have been adopted by the Commonwealth, state and territory, and local governments to manage disasters. Section 4 outlines the gaps in knowledge and the methods devised for the project to address these gaps. Section 5 provides a conclusion, including a brief distillation of the evidence collected.

1.1 Aims

The overall aim of the project is to provide guidance for SHAs and to assist them prepare for and respond to natural disasters and other environmental emergencies. To achieve this aim, the project has the following objectives:

- outline the strategies currently in place in Australia for disaster management at all levels of government and by agencies including SHAs
- identify from others' experiences of such events in Australia and abroad the lessons that might be learned and of use to SHAs
- identify the most effective policies and practices for use by SHAs in preparing for and responding to such events
- identify the networks linking different organisations and communities that can optimise how SHAs prepare for and respond to such events
- set out the best approaches and measures to use in preparing for and responding to such events in a guide for use by SHAs in Australia.

1.2 Context

The project is based on four premises: First, natural disasters and other environmental emergencies are complex phenomena that cause extensive damage at great cost to the affected regions and the nation. Second, changes in population and demography can affect the risks posed by such events. Third, climate and climate change are predicted to be important influences on the occurrence and intensity of such events in future. Fourth, stakeholders, including SHAs, have key roles related to housing issues in their management.

1.2.1 Natural disasters in Australia

Reporting on natural disasters is problematic but data are available on their incidence and impacts, and their costs and types at national, state and territory levels.

Issues in reporting natural disasters

Natural disasters are complicated in their reporting. They can have several sources, take different forms and combine multiple hazards to varying effect. For example, tropical cyclones have associated strong winds and rain that can cause flooding;

severe storms can incorporate some or all elements of: wind, hailstorms and thunderstorms as well as being linked to storm surges; and earthquakes are often followed by fire, flood, landslide and tsunami. Each can add to problems of erosion and water pollution or be beneficial, for example, in bringing rain to dry regions.

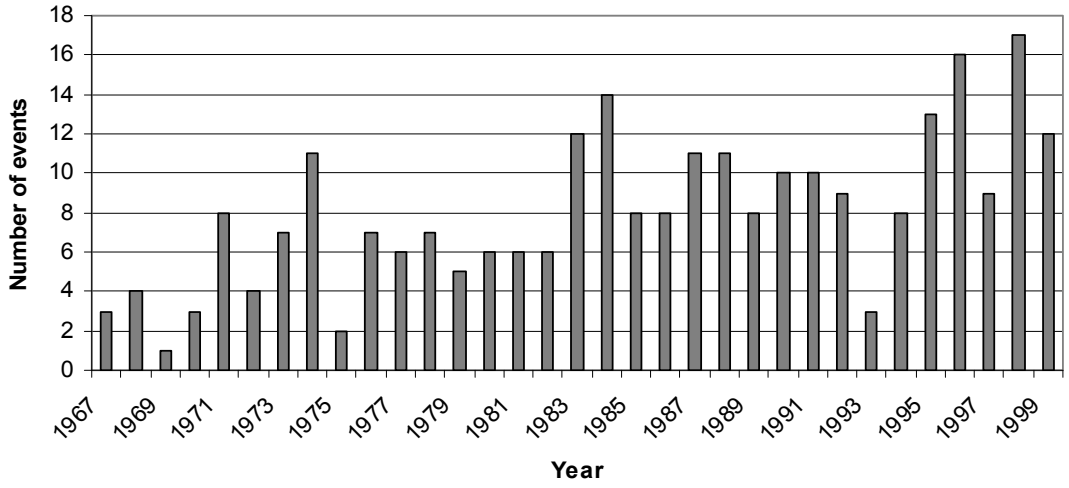
These events impact on individuals and communities differently. How they are recorded also varies. To constitute a disaster, they usually cause a minimum level of damage or number of injuries and deaths. Their costs are most often assessed in economic rather than social terms, overlooking injuries and deaths as well as other intangible costs.

Historical records of Australian disasters tend to be unreliable until the second half of the twentieth century but insurance records are accurate from 1967 onwards. Insurance records provide accurate data but only for claims against insured losses, and floods; tsunamis and landslides are especially under-represented.

The incidence and impacts of natural disasters

The incidence of natural disasters has increased (Figure 1). The most recent comprehensive data available (1967-1999) indicate an average of eight natural disasters with costs over $10 million occurring each year. However, there were often twelve or more such events over the 1980s and 1990s; and despite the short timeframe, this upward trend is statistically significant (BTE, 2001).

Figure 1: Number of natural disasters in Australia 1967-1999 exceeding $10m



Source: BTE, 2001

In addition to natural disasters with costs upwards of $10 million, many smaller but still destructive and costly events occur in Australia each year. For example, a report to COAG (2004) records 31 natural disasters occurring in 2001 but only ten with costs over $10 million. These other events comprise environmental emergencies rather than disasters as officially defined (BTE, 2001; COAG, 2004). Using a broad definition and extensive sources, Blong (2005) identifies more than 5,000 ‘hazard occurrences’ in Australia for the period 1900-1998. His data suggest that approximately 50 natural disasters and other environmental emergencies occur on average each year.

Since European settlement, Australia’s natural disaster mortality rate has fallen by three orders of magnitude (Blong, 2005). Such deaths and injuries have declined with the development of improved early detection and warning systems. Their highest

incidences occurred with the 1983 Ash Wednesday bushfires (75 fatalities, 2,700 injuries), Cyclone Tracy in 1974 (71 fatalities, 650 injuries) and the 1967 Hobart bushfires (62 fatalities, 900 injuries). Their other major cost was homelessness which directly affected 9,000, 41,000 and 7,000 people respectively (Middelmann, 2007).

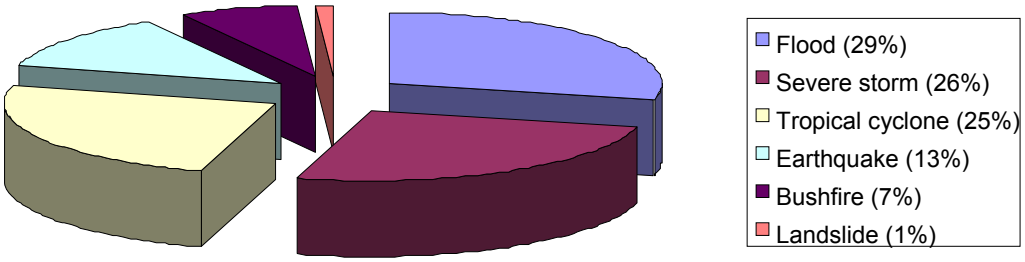
Official assessments of natural disasters usually exclude the costs of both death and injury and other intangibles such as emotional loss. Instead, they mostly comprise damage to property (buildings and infrastructure such as transport and telecommunications systems) but can (less often) extend to disruptions in business continuity and employment. The significance of partial damage as well as total loss of residential dwellings is reflected in Blong's (2003, 2004) development of a damage index applicable to all buildings and calculated as 'house equivalents'.

The loss of contents and other property is another important cost identified in claims made against insurance. It continues to grow as a proportion of natural disaster costs with Australia's increases in population and wealth. In fact, Crompton et al. (2008) suggest that affluence, and the number and value of dwellings, in particular, rather than climate change is what most explains the increased costs of natural disasters in Australia.

Costs to the nation by type of natural disaster and by state and territory

Hailstorms have contributed most to insured losses from natural disasters in the period since 1967, and the largest cost $1.7 million in Sydney in 1999, exceeding insured losses for both the 1989 Newcastle earthquake and Cyclone Tracy (Coleman, 2002). However, insured losses are only part of the costs of disasters and thus Blong (2005) ranks Cyclone Tracy and the Ash Wednesday bushfires ahead of the Sydney hailstorms as Australia's most destructive natural disasters in the period 1900-2003 based on all building damage. He also calculates that 93.6 per cent of all building damage in this period was caused by meteorological (cyclone, flood, bushfire and severe storms) rather than geological events.

Figure 2: Average proportional cost of natural disasters 1967-1999 by type



Source: BTE, 2001

The first and still most comprehensive report on the economic costs of natural disaster in Australia was compiled by the Bureau of Transport Economics (BTE, 2001). Using 1967-1999 data, it puts their average total national cost at $1.14 billion each year (adjusted to 1999 prices). However, this figure is unusual for including the estimated costs of injuries and deaths, which are otherwise excluded from their analysis. Likewise, disasters under $10 million, which are significant in number and on average comprise over half of the incidents that occur, are excluded as they have contributed only nine per cent to total economic costs (BTE, 2001:17).

Figure 3: Average annual cost of natural disasters 1967-1999 by type

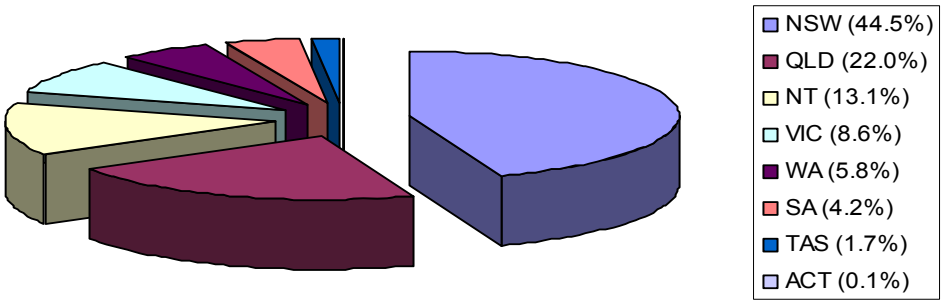
Natural disaster (type)	*Average annual cost ($ millions)*
Flood	314
Severe storm	284
Tropical cyclone	266
Earthquake	144.5
Bushfire	77
Landslide[1]	5
Tsunami	n/a

Source: BTE, 2001; except 1 EMA, 1999 (using 1900-1999 data)

The cost of natural disasters differs with the type of event (Figures 2 and 3). Floods, severe storms and tropical cyclones are most significant for Australia with average annual costs of $314 million, $284 million and $266 million, respectively, or 80 per cent of all natural disaster costs. Bushfires represent only seven per cent of total costs, averaging $77 million each year using 1967-1999 data, but they are 'the most hazardous type of disaster in terms of deaths and injuries' (BTE, 2001:xvii).

The cost of all natural disasters differs between states and territories (Figure 4). Two thirds of all such costs in Australia for the period 1967-1999 were incurred in New South Wales (44.5%) and Queensland (22.0%) alone (BTE, 2001).

Figure 4: Average proportional cost of natural disasters 1967-1999 by state and territory



Source: BTE, 2001

The significance of different types of natural disaster varies between states and territories based on their costs (Figure 5). For example, 94.1 per cent of all natural disaster costs in the Northern Territory relate to tropical cyclones because of its location but are also due, especially, to the one event of Cyclone Tracy (BTE, 2001). Likewise, the Newcastle earthquake contributed 94 per cent of all earthquake costs in Australia and 29 per cent of all natural disaster costs in New South Wales for this period (BTE, 2001). The 2003 Canberra bushfires and Cyclone Larry in Queensland in 2006 have since had similarly significant impacts (Middelmann, 2007).

Figure 5: Most costly types of natural disaster 1967-1999 by state and territory

State or territory	***Natural disasters***
New South Wales	Floods, storms
Queensland	Floods, tropical cyclones
Victoria	Floods, bushfires
Western Australia	Tropical cyclones, storms
South Australia	Floods, storms
Tasmania	Bushfires, floods
Northern Territory	Tropical cyclones, floods
Australian Capital Territory	Bushfires, storms

Source: BTE, 2001

1.2.2 Population and demography

The Australian Bureau of Statistics (ABS) has predicted that Australia's population will grow significantly over future decades. The increase will be due to immigration as well as to natural growth and mostly in the metropolitan and urban areas of coastal eastern Australia. The potential impact of natural disasters will be greater due to the population's increased size but also because of its changing demographic structure and location within Australia.

The national population is predicted to increase from its current size of 21 million in 2008 to over 30 million people by 2051 (ABS 2008). One of the consequences of a larger population for Australia is that more people will be at risk from natural disasters.

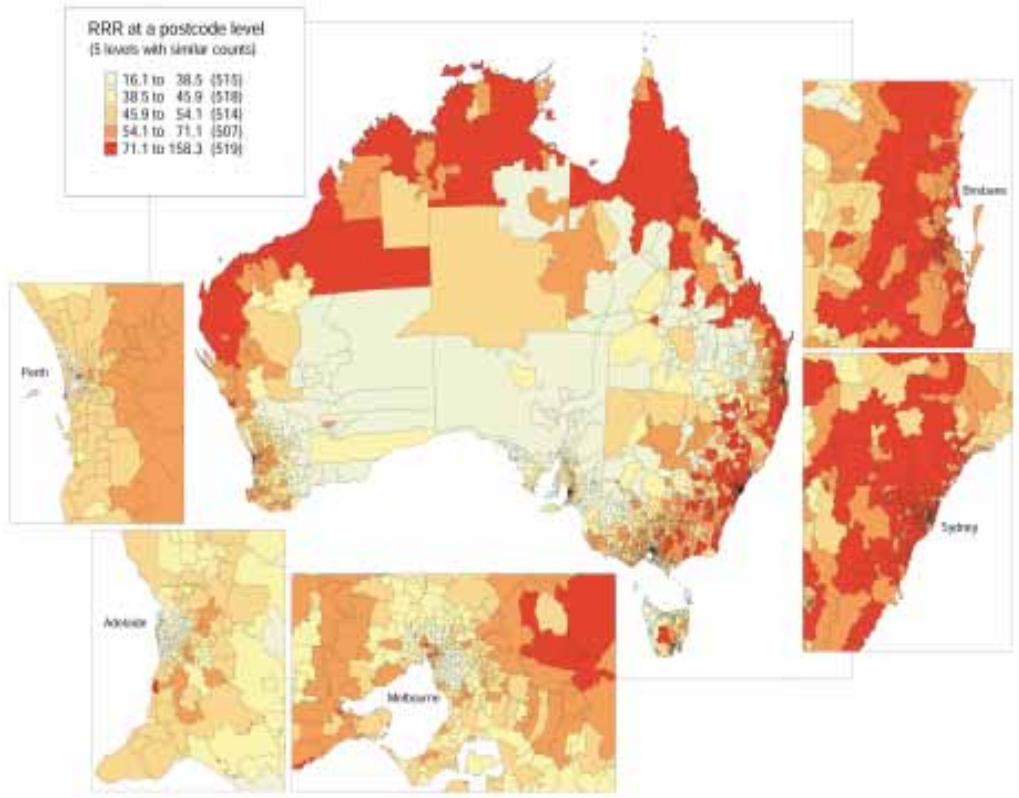
The demography of Australia includes structural ageing in the population (ABS 2008). Older cohorts are often highly dependent and among the most vulnerable in a disaster, thus putting the total population under extra pressure and at increased risk.

Even greater numbers of people will be affected if the nation's predicted population growth occurs in locations prone to natural hazards. Continued development at the urban fringe will add to such problems, especially if land is made available and housing is built in high-risk areas.

With 25 per cent of national population growth in the past decade taking place within 3km of the coast, predominantly in New South Wales and Queensland, an increasing number of larger communities are exposed to extreme events such as tropical cyclones, storm surges and coastal river flooding (CSIRO, 2002). In internal population shifts, known as sea-change and tree-change migration, both older, retired people and young families leave metropolitan cities to live in coastal and rural locations, increasing the pressures on local communities, governments and environments (Gurran et al., 2007).

National and sub-national changes in the Australian population's size and demographic structure are increasing the possible risk and impact of natural disasters and other environmental emergencies. The location of the Australian population is also a major factor. A comprehensive analysis of natural hazards in Australia (NHQ 2000 cited in Newton et al., 2001) constructs a relative risk rating for postcode areas based on cumulative data for twentieth-century damage to buildings. It indicates tropical cyclones, floods and bushfires as the most important natural hazards, but notes significant differences between local communities for each type of event. Combined risks present a major threat to coastal areas in Australia, which include its biggest metropolitan and regional centres (Figure 6).

Figure 6: Relative risk ratings for Australia by postcode



Source: NHQ 2000 in Newton et al., 2001

1.2.3 Climate and climate change

Climate and climate change are discussed here in relation to natural disasters and their management in an Australian context.

Climate and climate change and natural disasters

Climate influences the natural hazards capable of emerging as extreme events. With geography and topography (combined with human factors), climate determines their distribution, intensity and frequency. For example, cyclones tend to occur in tropical regions; flooding is most common in low-lying, riverine areas; and tsunamis are confined to coastal areas. The speed of their onset and duration, as well as time of occurrence, also shapes the impacts of natural disasters and how residents and emergency services might respond to them. For example, cyclones, floods and storms (and even tsunamis) can be detected in advance and early warning systems operated. Such events can be anticipated also because they are, like bushfires, seasonal phenomena. However, climate change is altering their incidence, geography and level of impact, and it now constitutes an important consideration in natural disaster management.

Global warming through increased atmospheric concentrations of greenhouse gases results from human activities such as deforestation and burning fossil fuels and is a major cause of local and regional changes in climatic conditions (IPCC, 2007). Extreme weather events worldwide are now therefore more numerous (WMO, 2003). Climate change is linked to heatwaves and droughts with related food production and disease vector problems, and to greater precipitation events, high winds and more intense and frequent floods, landslides and avalanches as well as cyclones, hurricanes and typhoons. They impact most on the world's poor and least developed nations, and so there have been heightened, international calls for the integration of natural disaster mitigation and climate change adaptation through sustainable development and making vulnerable communities more resilient (O'Brien et al., 2006; Sperling and Szekely, 2005; UN/IATFDR, 2006; UN/ISDR, 2004).

Climate change and natural disasters in Australia

In Australia, climate change is important because natural disasters are predominantly meteorological rather than geological phenomena. Trends in the frequency and intensity of extreme temperature and rainfall events are also rising faster here than global averages (Alexander et al., 2007). More extreme weather events include severe storms and floods; and while tropical cyclones may have become more intense, records are too short to determine whether their frequency has changed (AGO, 2005). Predictions suggest an intensification of tropical cyclones accompanied by a decrease in number but greater variability in storm tracking (CSIRO, 2007).

The Fourth Assessment Report of the IPCC (2007) confirms and extends its earlier findings. For Australia, it stresses regional variability in both the impact of climate change and the capacity for adaptation. Regional differences include increased rainfall in north-western Australia and decreased rainfall in southern and eastern Australia and are projected to intensify (Hennessy et al., 2007). Drier winters or summers in either region, respectively, are connected to the pattern of the El Niño-Southern Oscillation (ENSO) but associated La Niña events will alternately produce wetter seasons.

With global warming affecting the ENSO, more severe and prolonged droughts are predicted to increase with higher fire danger and pressures on the availability and security of water supplies. Changes in evaporative demand, relative humidity, wind speeds and lightning strikes will further affect fire regimes in Australia as fires become

more frequent and intense, spread faster, and are less easily extinguished (Pitman et al., 2007; Williams et al., 2001). Fire seasons will also extend, with more severe fires occurring earlier in the season, shifting and shortening the opportunities for controlled burn-offs and increasing the costs of fire management.

Sea level rise will also increase with global warming and is significant for natural disaster mitigation in Australia because a large proportion of the population live in coastal areas. These communities are already exposed to increasingly extreme events such as tropical cyclones, storm surges and coastal river flooding. More extreme winds are now also expected which, with high-intensity rainfall and sea level rise, will influence the extent and height as well as the return periods of floods and storm surges (CSIRO, 2007; Pittock, 2003).

Climate change and natural disaster management

According to the IPCC (2007), increased risks to major populations and infrastructure due to climate change in Australia will demand changes in disaster management. 'By 2030, design criteria for extreme events are very likely to be exceeded more frequently. Risks include failure of floodplain protection and urban drainage/sewerage, increased storm and fire damage, and more heatwaves, causing more deaths and more blackouts (high confidence)' (Hennessy et al., 2007:509).

The greatest risks concern climate variability, weather extremes and shifting hazard zones as traditional approaches may fail to cope with the new patterns of impact (COAG, 2004). However, adaptive measures are being taken with the mainstreaming of climate change issues into policies, plans, legislation, strategies and other requirements for urban and regional development and natural disaster management.

Both drivers and barriers to change have been identified in Australian natural disaster management. Most important are the methods used for the integrated assessment of impact and adaptation; the development of evaluation tools; the uptake and application of knowledge; and the linkages across the different levels and practices of government (Allen Consulting Group, 2005; Hennessy et al., 2007).

1.2.4 Key stakeholders

Natural disaster management in Australia involves all tiers of government and its associated agencies as well as various organisations, community groups, volunteers, researchers and the media (COAG, 2004; EMA, 2004). Housing stakeholders are especially important in this context.

The increased likelihood of natural disasters and other environmental emergencies in Australia suggests more damage to property including residential and other buildings and infrastructure. Potential impacts will present major housing issues in terms of evacuation, sheltering and the provision of short- and long-term accommodation. Key housing stakeholders include planners and non-profit organisations, but insurance and construction sectors as well as SHAs will have increasingly significant roles.

A less predictable climate will reduce the capacity to calculate, price and spread the risks of natural disaster. The international insurance industry recognises that even small increases in meteorological events have significant multiplier effects (Munich Re Group, 2007; UNEP/FI, 2002). Insurance Australia Group (IAG) has indicated that a 25 per cent increase in peak gusts causes more than six-fold increases in building damage claims (Coleman, 2002). Research on climate change and natural disasters is being conducted with Australian insurance groups (Coleman, 2002; Crompton et al., 2006). It notes increased risks to people and their homes from bushfires as developments encroach on bushland (Chen and McAneney, 2005) and from floods

and storms as populations increase in low-lying coastal areas (Chen and McAneney, 2006).

Insurance and construction industries were effective in lobbying for improved building regulations after Cyclone Tracy in 1974 and in sponsoring education programs after Wollongong flooded in 1998 (Blong, 2004; Coleman, 2002). Overseas, active roles in the production of more resilient communities have been identified for both insurance professionals (Crichton, 2007; Kunreuther, 2006) and building professionals (Bosher et al., 2007a; Bosher et al., 2007b; Spence, 2004). Adaptive responses in Australia include the insurance sector's refusal or conditional provision of cover at higher, risk-related premiums, and the construction sector's use of new building designs, materials and practices.

SHAs are aligned with respective state or territory governments which provide relief measures through their management of emergency services. SHAs also work with local government as city and regional councils have specific strategies and often act as lead agencies in local planning as well as with local communities and individual householders to reduce vulnerability. Section 3 of this report provides more detailed summaries of the role of SHAs.

Reports following Cyclone Larry in 2006 (Queensland Government, 2007) and the Canberra bushfires in 2003 (Camilleri et al., 2007) indicate that SHAs were key agents in the response to both natural disasters. In their assistance to public housing tenants, SHAs provided support in the following areas: temporary accommodation, repairs, planning, transport and transitional arrangements. They worked with welfare agencies and government as well as communities and were active partners with the housing industry in the reconstruction process, assisting with the provision of temporary and longer-term accommodation, clearance of debris, building schedules, contracts, material supplies and tradespersons and other similar arrangements.

SHAs are among the few agencies with the institutional capacity required for planning and executing these tasks. They are also well positioned to interact with all levels of government and to work with other organisations and communities in effecting a quick, local response. As the incidence and impacts of natural disasters and other environmental emergencies are expected to increase with the changes in population and climate predicted for Australia, the demands on SHAs are likely to grow.

1.3 Definitions

Definitions of the key concepts and terms used here are provided below. They rely on risk management standards (AS/NZS, 2004), recent Australian reports (Middelmann, 2007) and other sources as cited.

1.3.1 Key concepts

Catastrophe

A catastrophe is of greater magnitude than a disaster: 'an extreme natural hazard event which impacts on a community, or communities, resulting in widespread, devastating, economic, social and environmental consequences' (COAG, 2004:63). It would exceed the response and recovery capacities of the affected state or territory and the nation combined across all jurisdictions, requiring assistance from other states or territories, and overseas.

Emergency

An emergency is of lesser magnitude than a disaster: 'an event, actual or imminent, which endangers or threatens to endanger life, property or the environment, and which requires a significant and coordinated response' (COAG, 2004:103).

Mitigation

Mitigation comprises those measures or arrangements that are adopted in advance of disasters and emergencies or after they have passed so that the impacts for the community and the environment are minimised in future.

Natural Disaster

A natural disaster is 'a serious disruption to a community or region caused by the impact of a naturally occurring rapid onset event that threatens or causes death, injury or damage to property or the environment and which requires significant and coordinated multi-agency and community response. Such serious disruption can be caused by any one, or a combination of bushfire; earthquake; flood; storm; cyclone; storm surge; landslide; tsunami; meteorite strike; or tornado' (COAG, 2004:103).

Natural Hazard

A natural hazard is 'a source of potential harm or a situation with a potential to cause loss' (COAG, 2004:103). As an existing or potential event or condition that may cause harm, a hazard poses risks to the community or the environment.

Preparedness

Preparedness comprises those measures or arrangements which ensure that, if a disaster or emergency occurs, the community is able to cope and that the necessary resources and services can be efficiently mobilised and deployed.

Prevention

Prevention comprises those measures or arrangements that can be put in place to eliminate or reduce the incidence and impacts of disasters and emergencies.

Risk

Risk is the chance of something happening that will have an impact on a current or future set of conditions or states. It usually refers to 'the likelihood of harmful consequences arising from the interaction of hazards, communities and the environment' (EMA, 2002:77).

Recovery

Recovery is 'the coordinated process of supporting emergency-affected communities in the reconstruction of the physical infrastructure and restoration of emotional, social, economic and physical wellbeing' (EMA, 2004:32).

Resilience

Resilience can be a characteristic of people, places and communities. It relates to their ability to anticipate, prepare for, respond to and recover quickly from the impacts of disaster, and is determined by their capacity to organise, learn from past events and improve risk reduction (Mayunga, 2007; UN/ISDR, 2005).

Response

Response comprises those 'actions taken in anticipation of, during, and immediately after an emergency to ensure that its effects are minimised, and that people affected are given immediate relief and support' (EMA, 2004:32).

Vulnerability

Vulnerability relates to 'the characteristics of a person or group or area in terms of their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard. It involves a combination of factors that determine the degree to which a person, property or locality's condition and performance is put at risk by a discrete and identifiable event in nature or society' (Blaikie et al., 1994:9).

1.3.2 Key terms

Bushfires

In Australia, bushfires are fires in vegetation such as scrub, forest, and grasslands, and usually result from lightning strikes or ignition by individuals (accidental or wilful). Bushfires close to human settlements pose a significant threat to life and property. The vegetated regions of southeast Australia, such as the Blue Mountains in New South Wales, the southern parts of Western Australia, Tasmania, Victoria and South Australia, are most at risk.

Bushfire events involve exposure to flame, radiation heat and ember attack. Other primary influences are weather conditions (as the incidence of bushfires is greatly increased in hot, windy conditions) as well as vegetation type, fuel load and local topography such as slopes or ridges (Leonard et al., 2004). Housing built on the urban fringe is most vulnerable to bushfires (Chen and McAneney, 2005) and, in particular, within 500 metres of a bushland interface edge (Leicester and Handmer, 2008).

Cyclones

Cyclones are low pressure systems which develop with strong winds and warm sea surface temperatures. They are termed typhoons and hurricanes in the US when they have hurricane force winds (over 118 km per hour) but are known in Australia as tropical cyclones because they tend to build up over the tropics. They are most common in the northern regions between December and April.

Cyclones can lead to severe winds and heavy rains. At landfall, floods can occur but potentially most dangerous is a storm tide, which combines the normal astronomical tide with storm surge. Its height and danger are greatest with a full tide but inundation is also influenced by the coastal features (geomorphology, bathymetry and wave run-up) as well as the cyclone's magnitude and approach (Nott, 2004) combined with the volume of surface runoff from the high intensity rainfall.

Earthquakes

Earthquakes result from tectonic plate movements which cause fracturing along fault-lines and seismic waves. Australia is located within the Indian-Australian plate, which does not encompass tectonic plate boundaries, but earthquake occurrences are always possible. The city considered at greatest risk is Adelaide, having had more medium-sized earthquakes than any other in the past 50 years (Middelmann, 2007).

The main hazard associated with earthquakes is ground shaking which destroys buildings and results in injury and death. It also causes liquefaction (forced subsurface loss of water), and subsequent ground-failure which weakens building foundations. Movement through fault ruptures also displaces the ground vertically and horizontally, causing significant damage to buildings and infrastructure.

Floods

A flood is 'the overflowing by water of the normal confines of a stream or other body of water or the accumulation of water by drainage over areas not normally submerged' (BTRE, 2002:153). It usually takes the forms of fluvial flooding when the ground and

streams and rivers fail to absorb and transport water; and/or pluvial flooding when natural and artificial drainage systems have insufficient capacity to cope with the volume of surface water. Less common is groundwater flooding when underground water levels rise above natural surfaces, and coastal flooding when the sea level rises above coastal land (Pitt, 2008).

The main cause of flooding is heavy rainfall but it can also occur with high-tides, melting snow, storm surge, cyclone and tsunami as well as with mechanical failures like a dam burst. The damage caused by flooding is not just dependent on water depth; other factors include its velocity and duration. Flash flooding follows intense rain and is significant because of its unpredictability and rapid onset. Inundation can also occur on floodplains often hundreds of kilometres from the rainfall event and subject human settlements to extended periods of disruption and property impact.

Storms

Storms are atmospheric disturbances of two main types. Synoptic storms involving low pressure systems and cold fronts are frequent on the east coast of Australia in autumn and winter. Thunderstorms develop with convective warming and the rapid rise of air into an unstable atmosphere, and are most common in New South Wales and Queensland between September and March.

Synoptic storms produce heavy rains but also high winds, which can exacerbate bushfires, or they can produce sleet, hail, and ice and sometimes snow at low elevations. Thunderstorms last only a few hours but cause lightning, thunder, hazardous wind gusts, heavy rainfall and hail. Both storm types are also associated with dangerously high seas and storm surge.

Severe storms can have gale force winds (exceeding 63 kilometres per hour), gusts (exceeding 90 kilometres per hour) and/or storm force winds (exceeding 150 kilometres per hour), hail stones exceeding two centimetres in diameter, flash floods, and/or tornadoes. Most damage results from strong winds and flooding but hail can collapse roofs and lightning strikes can be fatal.

Landslides

Landslides, also known as slumps, mudslides or landslips, arise from the downward movement of soil and other material on unstable slopes and can occur without prior warning. Land instability is common in many localities throughout Australia and much human activity can either encourage or prevent landslides. Landslides can occur either on deep-seated, steep terrain (sometimes with houses and subdivisions built on it) or on shallow embankments (for example, next to roads and railway lines) as well as in the forms of rockfall and/or debris flow.

Contributing factors in their occurrence include local topography, type of subsurface material and vegetation cover, but most common is an increase in water retention in the soil following heavy rains or leaks in water containers or pipes. Other factors are earthquakes, vibrations from human activity and processes (natural and artificial) which undercut slopes. Most landslides are small but can be frequent, and most costs accumulate in damage to infrastructure. Only one such event in Australia (at Thredbo, NSW, in 1997) has been classified as a natural disaster.

Tsunamis

Tsunamis are powerful waves generated by shocks in the sea floor and the displacement of large masses of water due mostly to undersea earthquakes but also landslides, volcanic eruptions and meteor impacts. They are rare events in Australia

but since the catastrophe of the Indian Ocean tsunami of December 2004, Australia has increased its work in risk assessment and mitigation of their potential impacts.

Tsunamis slow down but intensify as they approach the shore, reaching heights up to 10 metres often with extensive run-up and inundation distance. They can drown local populations without warning as well as destroy coastal buildings and infrastructure. Earthquakes and other causal events up to thousands of kilometres away can produce tsunamis that affect Australian coastal communities.

2 REVIEW OF INTERNATIONAL LITERATURE

This section details approaches to natural disaster management in international policy and practice, provides three international case studies examined from a housing focus, and discusses the lessons learned overseas and their relevance to Australia.

2.1 International policy and practice

International policy and practice in disaster management varies across jurisdictions but has some common principles. The pre-disaster stage concerns the assessment of risks, and the prevention as well as mitigation of natural disasters through planning and preparedness. The post-disaster stage involves responses made during and after such an event, ranging from the provision of search and rescue, medical care and emergency sheltering through to long-term recovery and reconstruction (Mileti, 1999; Blaikie et al., 1994).

There has been a shift in recent decades from response and recovery towards more planning and preparedness (Pearce, 2003; Perry and Lindell, 2003). It includes an increased focus on vulnerability in general rather than specific hazards; the use of more proactive measures such as land-use policies and management plans; the pursuit of multi-agency and multi-disciplinary approaches; and working more closely with communities (Figure 7). To succeed, such approaches need the participation of individuals and institutions, incorporating their values, interests and goals, and to be linked to local decision-making processes (Christoplos et al., 2001; Pearce, 2003).

Figure 7: The shift in natural disaster management strategies

From	***To***
Hazards	Vulnerability
Reactive	Proactive
Single agency	Partnerships
Science driven	Multi-disciplinary approach
Response management	Risk management
Planning for communities	Planning with communities
Communicating to communities	Communicating with communities

Source: Pearce, 2003

Vulnerability assessment includes the risk of physical exposure to a hazard but also socio-economic and demographic factors (Blaikie et al., 1994; Peacock et al., 1997; Phillips and Morrow, 2007). Poverty, age, gender, race, ethnicity, occupation and family structure are important variables which influence the perceptions of risk and preparedness and the capacities for response and recovery. But urban density, housing stock and tenure are also significant factors in vulnerability (Cutter et al., 2003; Fothergill and Peek, 2004).

Building community resilience as well as reducing vulnerability is important in disaster management (Mayunga, 2007). It characterises major UN policies (UN/ISDR, 2004; 2005) as well as current policy and practice in the US, UK, Australia and New Zealand (Britton, 2002; Buckle et al., 2000; Mileti, 1999; O'Brien and Read, 2005). Resilience is sought through more 'holistic', 'comprehensive' or 'integrated' approaches involving both public and private institutions, all levels of government, partnerships with community groups and other organisations, and the pursuit of economic efficiencies (Britton, 2002; McEntire *et al.*, 2002; O'Brien and Read, 2005). The resilience of a

community is often explained in relation to its social capital (social norms, trust and networks) but extends to economic, physical, human and natural capital (Mayunga, 2007; Nakagawa and Shaw, 2004).

Post-9/11 disaster management has been reinvented for technological emergencies and terrorism in terms of civil contingencies, crisis planning and centralised government powers (McConnell and Drennan, 2006; Perry and Lindell, 2003). Public authorities' roles have increased as new peak bodies such as the US Department of Homeland Security and the UK Civil Contingencies Secretariat have been formed; the roles and resourcing of organisations such as EMA in Australia, and the Directorate General for Public Order and Safety in the Netherlands, have intensified; legislation now demands that some institutions have crisis plans and other arrangements (for example, for business continuity); and such requirements are built into good governance by mainstreaming rather than marginalising disaster management.

Most policy and practice integrates an all-hazards approach that protects the public and reduces losses as communities and government at all levels assess vulnerabilities, focus on generic tasks, and then plan for contingencies guided by risk-based assessments. It has four main components of *mitigation*, which consists of long-term activities such as use of land-use planning and building codes to reduce community vulnerability; *preparedness* with activities that develop the capabilities for responding to disasters; *response* activities that are aimed at protecting life and property; and *recovery* activities which are pursued in the short- and long-term.

Recent additions include more complex and novel approaches in risk management and insurance (Comerio, 2004; Comfort, 2005; Kunreuther, 2006). New technologies in forecasting and warning systems or in engineering, land-use planning (such as GIS) and building codes (as well as risk management and insurance) are also important 'tools of sustainable hazard mitigation' (Mileti, 1999).

Figure 8: Principles of good disaster management

- → views disasters as both quantitatively and qualitatively different from accidents and minor emergencies
- → highlights a continuing planning process rather than the production of an end-product, such as a written plan.
- → adopts a multi-hazard rather than a single-hazard focus, and is generic rather than agent specific
- → builds on the notion that what is needed is a model that focuses on the co-ordination of the emergent resources, rather than trying to impose some kind of command and control
- → focuses on general principles rather than specific details
- → assumes potential victims will react well, instead of badly, during the emergency time of major crises
- → emphasises the need for intra- and inter-organisational integration in the process
- → encourages appropriate actions by anticipating likely problems and possible solutions or options
- → builds on social-science research findings derived from systematic data rather than personal anecdotes or 'war stories'
- → includes all four time phases of the planning process (that is mitigation, preparedness, response and recovery) rather than a single phase.

Source: Quarantelli, 1997

Good disaster management builds on basic principles (Figure 8). Improvement relies on events informing policy and practice. For example, Berke and Campanella (2006) use hurricane Katrina to make policy planning recommendations. Their work also indicates the centrality of housing with references to 'short-range emergency and rehabilitation actions (temporary housing, damage assessment, debris removal, restoration of utilities, reoccupancy permitting, reconstruction priorities) and long-range redevelopment decisions (building moratoria, replanning of stricken areas, relocation of housing to safer sites)' (Berke and Campanella, 2006:193).

Insights from international cases, likewise with a housing focus, are detailed below. But, first, it is worth noting some important links between disaster management, spatial differences, vulnerability, resilience and housing. Good disaster management uses a geographical approach which allows for differences between places including the presence (or not) of those natural hazards that trigger such events. It includes the geographic factors of site, situation, slope and elevation as well as proximity which together with geomorphology and vegetation, for example, constitute a locale's bio-physical vulnerability. However, the vulnerability of a place is also affected by the social fabric and the community's experience with hazards, and its capacity to respond to, cope with, and adapt to hazards, which is influenced by economic, demographic and built environmental factors (Cutter, 2003; Cutter et al., 2003). Housing is a major component of this last factor, too, and thus urban density, and housing stock and tenure type are strong indices of social vulnerability (Cutter et al., 2003). It is therefore now informing conceptions of community resilience as well as place vulnerability in relation to natural disaster (Cutter et al., 2008). Moreover, the way different places are understood at the level of residential subpopulations and local neighbourhoods is also proving to be critical to recovery. Housing and its redevelopment and upgrade (or not) is again significant for determining how yet more

possible disasters might play out variously across affected regions in the future (Pais and Elliott, 2008).

2.2 International case studies: a housing focus

Three international case studies here illustrate the outcomes of different policies and practices for nations other than Australia specifically in relation to housing.

2.2.1 On case studies in disaster research

The applicability to highly urban, industrial societies of disaster research conducted in developing countries (and *vice versa*) is not straightforward, and even the validity of such distinctions can be questionable (Quarantelli, 1992, 1997). The use of overseas experience in Australian disaster research can be problematic but provides valuable insights. Issues of transferability still occur, for example, with data across rural towns and metropolitan areas in national research (Handmer, 2006). Comparative international studies are few in number but informative on housing issues (see, for example, Inam, 1999; Wu and Lindell, 2004).

Three case studies are selected from the developed world and considered most relevant here also as they represent natural disasters of the types threatening Australia. They comprise hurricane Katrina which hit New Orleans, US, in 2005; the 2007 summer floods in the Midlands, UK; and the 1995 Great Hanshin-Awaji earthquake in Kobe, Japan.

2.2.2 Hurricane Katrina, New Orleans US, 2005

Hurricane Katrina was the third strongest hurricane on record to make landfall in the US and had a devastating impact across 90,000 square miles and on the mostly coastal populations of Louisiana and Mississippi. When it struck land 75 km south-east of New Orleans on 29 August 2005, a six-metre storm surge caused levee failures and flooding in over 75 per cent of the city (Green et al., 2007). However, storm damage and flooding were widespread and accompanied by power failures, dwindling supplies of drinking water and food, and inadequate or delayed provision of law enforcement, search and rescue efforts and medical support (Cutter et al., 2006).

Total costs include 1,330 deaths (80 per cent in New Orleans metropolis, with 215 lives lost in nursing homes and hospitals), $96 billion (USD) in property damage, and 1.1 million evacuees, far outweighing the $3.13 billion (USD) cash and in-kind donations and international aid then offered (Menzel, 2006). In southern Louisiana and Mississippi alone, according to FEMA, hundreds of thousands of homes were damaged or destroyed, and up to 600,000 families needed transitional housing (Sard and Rice, 2005). While 85,000 homes suffered major damage, 416,000 were totally destroyed of which 47 per cent were rental tenure (rising to 55 per cent in New Orleans) and 71 per cent classified low-income 'affordable' housing (Tierney, 2006).

After five weeks, estimates suggest that about 435,000 people were housed in hotels or motels across the country, while another 60,000 were still in mass shelters, but excluding the tens of thousands of families staying with friends and relatives or in other short-term accommodation (Sard and Rice, 2005). Both evacuation and mass sheltering caused profound psychological as well as economic damage (Brodie et al., 2006). More than 100 days later Congress approved $62 billion (USD) hurricane relief aid as FEMA continued to operate 132 Disaster Recovery Centres in the Gulf Coast area with over 14,000 personnel in the field. By December 2005, FEMA had removed nearly 53 million cubic yards of debris, and provided more than $5 billion (USD) in financial and housing assistance, and while more than 400,000 people remained in temporary accommodation, 6,600 were still unaccounted for (Cutter et al., 2006).

New Orleans was suffering an affordable housing crisis before Katrina. The city's Housing Authority had some of the worst public housing in the country (of which 47 per cent was vacant), and it was under HUD receivership at the time of the hurricane (Popkin et al., 2006). Concentrations of unemployed, low-income, black and female-headed households (as well as the elderly and disabled) comprised the communities worst hit. Although 62 per cent of the residents in the Lower Ninth Ward, for example, owned their modest homes they were not insured against the flood, whereas public tenants in the infamous housing projects of Desire/Florida may never be able to return to their communities due to the extent of the destruction (Popkin et al., 2006).

The government's management of the disaster was unsatisfactory in that it delivered insufficient resources too late and without a coherent plan. For the people displaced, FEMA's Katrina Disaster Housing Assistance Program provided just 18 months' assistance but only for households that were previously homeless or already subsidised; and its vouchers were inferior to the traditional HUD Section 8 vouchers as they could not be used to pay for utilities or to move to another jurisdiction (Sard and Rice, 2005). Evacuees in host cities were not assisted in finding new homes, their vouchers were not always accepted, and they were faced with rising rents; home-owners received three months grace with mortgages but further mortgage assistance from HUD was provided only to those with jobs and/or funds to rebuild; and caravans and trailer 'villages' attracted opposition from both the people expected to live in them and the communities where they were located (Popkin et al., 2006).

2.2.3 Summer Floods, Midlands UK, 2007

With the wettest summer on record, England and Wales had exceptionally heavy rains during the weeks of 20 June and 18 July, 2007, with two severe flooding events. Worst hit were South Yorkshire and Hull, then Gloucestershire, Worcestershire and the Thames Valley in 'the biggest civil emergency in British history' (Pitt, 2008:x). Costs included 13 deaths with approximately 48,000 households and 7,300 business flooded. Damage to critical infrastructure was extensive, thousands of people were stranded on motorways, forced from their homes or left without essential services (water and power) and transport links and telecommunications were disrupted.

The scale and speed of the flooding were unexpected. Although heavy rain had been forecast, people thought it would not affect them, and when it arrived did not know how to react. With the first flood, more than 600 injuries as well as seven deaths were recorded by 28 June. On the first day just in Sheffield, 900 people entered emergency accommodation due to stranding (Stevens, 2007). In Hull, over 8,600 households or approximately 20,000 people were affected with 6,300 people obliged to live in temporary accommodation, including over 1,400 in caravans (Coulthard et al., 2007). With the first flood, the homeless were concentrated in cities where rivers had burst their banks and major drainage systems had failed; they numbered about 17,000 in Hull, 1,000 in Doncaster and 1,000 in Sheffield as up to 28,000 homes in the region were severely affected or totally ruined (Stevens, 2007). With the second flood, there were similar events and numbers of people displaced. In June, in Sheffield, the forced closure of the Neepsend electricity substation had resulted in the loss of power to 40,000 people but in July, the flooding of Severn Trent Water's Mythe water treatment works left 350,000 people without mains water supply for over two weeks (Pitt, 2008).

The government relief package announced on 7 July was £14 million but seen by the affected communities as inadequate (Stevens, 2007). By 12 July £8 million of it was allocated to local authorities to help in the clear-up, with Hull, Doncaster and Sheffield receiving £2.1, £1.6 and £0.6 million, respectively (SCC, 2007). Sheffield City Council

put the total flood damage there at £30 million (SCC, 2007). For Hull City Council, a total of 1,986 council homes or seven per cent of its public housing stock was affected by the floods, with estimated costs of £19 million (Coulthard et al., 2007). These figures have since been almost doubled to 3,500 council homes and 12 schools by a consultant who noted that Hull City Council defied government policy by not insuring any of its 28,500 properties (Crichton, 2007). Following the second flood, another £10 million was promised on 24 July, and £31 million of EU aid was announced on 10 December, yet costs to the insurance industry alone will total £3 billion (Pitt, 2008).

Insurance claims were a priority for affected homeowners, but up to one fifth were not insured, and annual premiums are now likely to rise by 30 per cent for people living in flood-risk areas (Stevens, 2007). Insurers criticised the government for planning to build, by 2020, one million or a third of all new homes on flood plains (BBC, 2008a). They also advised that cover should be conditional on fitting flood protection devices and reflect actual risks, and they warned of increasing legal action by insurance companies seeking damages over claims (Crichton, 2007). About a year later, the ABI confirmed that it had received 130,000 claims for homes, 30,000 for businesses and 20,000 for motor vehicles, and had put 17,000 households into alternative accommodation, predicting that 96 per cent of policy-holders would be back home by the time of the floods' first anniversary. However, as at the end of May 2008, local authorities estimated that 4,750 households were still not in their homes (Pitt, 2008:143). As one NFF consultant remarked, many people had returned 'only because they've had no choice, and it's questionable as to whether their homes are actually liveable' (BBC, 2008b).

2.2.4 Great Hanshin-Awaji Earthquake, Kobe Japan, 1995

At 5:46 am on 17 January, 1995, an earthquake of magnitude 7.2 on the Richter scale hit Kobe in the Japan prefecture of Hyogo. It caused levels of damage unprecedented in a modern city and closed down the world's sixth largest cargo port. The collapse of communication and transport systems added to the confusion, hampering rescue efforts. Estimates suggest 20,000 people were trapped in collapsed buildings and 300 fires occurred while disruption to utilities meant that more than 1.3 million households were without water and 2.6 million lost electricity (Tierney and Goltz, 1997).

In the following week, 342,000 people sought refuge in 1,153 shelters. Costs included 6,279 deaths with 34,900 injured, and over $100 billion (USD) in damages as 136,000 housing units were destroyed or subsequently demolished and more than 300,000 persons lost their homes (Tierney and Goltz, 1997). However, as well as the quake, fire was a major factor in the damage and 7,000 buildings were completely burned down (Nakagawa and Shaw, 2004). Recent estimates suggest that housing represented over 95 per cent of the total building damage and 50 per cent of the total value of the damage, with about 400,000 housing units in 192,000 residential buildings damaged (Johnson, 2007). Most of the damage was to poor quality, inner city housing that most affected low-income and elderly residents (Hirayama, 2000).

Displaced persons were sheltered in parks, schools and public buildings as the Japanese government funded the building of 48,300 temporary housing units to house 100,000 people. However, the supply of prefabricated materials was a challenge for local businesses and the final construction time was seven months and not two months as scheduled (Tomioka, 1997). Despite the location of temporary housing in the city's parks and schoolyards, 69 per cent of houses were located in distant

suburbs or on Awajishima island, two hours commuting time away, far from services and separated from extended family and friends (Comerio, 1998).

Kobe's rehabilitation commenced two months afterwards under the government program of Designation of Land Readjustment and Redevelopment Areas but was criticised for proceeding without community consultation and being relatively inflexible (Nakagawa and Shaw, 2004). It was also highly selective as government funding and public agency involvement were provided for recovery efforts in only the worst hit areas, leaving others with inadequate support. These areas were designated 'black zones' and subject to compulsory land acquisitions which were often popular since they were mostly tax-exempt. As the sites of official projects, they were more successfully redeveloped than their 'white zone' counterparts because they were obliged to form Town Development organisations which were absent beforehand but facilitated important links between residents, government officials, consultants, technical advisors and others. Such organisations were subsequently formed also in the 'white zones' without official recognition while others, which had existed prior to the quake, were recognised in areas called 'gray zones'. Although both zones were denied the preferential treatment afforded 'black zones', some achieved effective recoveries through local involvement and strong leadership made possible with such organisation and community participation (Nakagawa and Shaw, 2004).

In Japan, the provision of temporary housing after a disaster is usually for a period of only two years but, in this case, was extended to three years (Tomioka, 1997). In fact, three years after the Kobe earthquake, 45 per cent of the temporary houses were still occupied. This situation, according to Hirayama (2000), resulted from an inadequate supply of affordable permanent housing and a temporary housing program that further entrenched socio-economic and spatial polarisation by servicing only the most needy and desperate of people in isolation from others.

2.3 Lessons from abroad and their relevance for Australia

A summary of the findings from disaster research on housing overseas is provided, following some comments on the use of disaster research in policy development.

2.3.1 On policy learning

Natural disasters provide opportunities to learn lessons for policy and practice. Disaster research usually has such objectives, yet this relationship is difficult and its complexity often unacknowledged. Solecki and Michaels (1994:587) pursue the assumption that 'natural disasters serve as focusing events that generate policy windows in their wake' to stress both the contingency of such windows opening and the uncertainty of policy changes resulting. Birkland (2006), on the other hand, demonstrates policy learning but it is highly variable, subjective, and likely only after extreme events.

Recommendations from disaster research are often structured in terms of learning lessons, but there is a difference between gaining knowledge and applying it. Quarantelli (1997) compares the idealistic goals of disaster planning with the reality of responding. Other researchers suggest 'the evolution of emergency management' (Britton, 2002:45; O'Brien and Read, 2005:353). However, natural progression or cumulative developments in policy and practice are not necessarily guaranteed.

Following hurricane Katrina, Birkland (2006) notes the possibility of un-learning the lessons of earlier disasters. Tierney (2006:22) identifies a common rhetoric in subsequent policy responses which she describes as 'fantasy documents' but then

states: ‘These kinds of “lessons learned” documents can result in sound recommendations as well as symbolic ones. The key question is whether those recommendations that are sound will lead to action and change’. Likewise, Gerber (2007:237) comments that ‘even if learning does occur, its sustainability is unclear. Hazard mitigation is in many ways not a question of scientific understanding but of political will, a will that is found to be lacking in many instances’.

2.3.2 Housing issues in disaster research

Analysis of housing issues in disaster research includes work in developing countries (for example, Johnson, 2007), but research relevant to Australia is mostly from the US.

Definitional research

Quarantelli (1992) comments that shelter and/or housing presents problems for organisations as much as for individuals or households (in planning, communication, mobilisation and coordination). Problems with the quality, timing and administration of its provision persist, but there are also changes with shifts in household composition, demographics, social expectations and cultural differences.

He also notes that the terms ‘sheltering’ and ‘housing’ have been used in many overlapping and contradictory ways so provides further distinctions:

- Emergency sheltering is usually sought for up to one night often in otherwise unacceptable quarters including schools, stadia, churches and barracks. It requires the least preparedness in planning, and staffing needs are minimal, but providing emergency medical care may be a problem.
- Temporary sheltering extends beyond an emergency’s peak, also has requirements such as feeding large numbers of people, and requires large amount of planning. Mass or public shelter arrangements are its least favoured option but effective for distributing food, information and medical care. Coordinated organisation is necessary but difficult; differences and conflicts arise; and workers are often inexperienced. The alternatives are little understood, and staying with family and friends a preferred option. Both types of shelter vary with factors such as age, gender, class and family structure.
- Temporary housing re-establishes household routines before more permanent quarters are obtained, and is most used by renters (perhaps relating to income, previous housing quality and its damage, or social class). Associated logistical problems include timing, long waits and matching households to appropriate accommodation. Rental assistance is favoured, especially by higher socio-economic households, whereas the poor and elderly are harder to accommodate. Hotel/motel options are also used but rarely pre-planned. Interim housing in the form of modular units is preferred to trailers and can be quickly and cheaply erected close to or on the site of residents’ former homes.
- Permanent housing is least considered; often provided on an *ad hoc* basis by organisations with arrangements between local and federal agencies; and poorly inventoried and understood. Home-owners usually return home but renters take longer to find permanent housing and often go to new locations. The kind of permanent housing that results with reconstruction usually relates to the pre-disaster situation, but can be shaped with the participation of private business and community groups. Government policy and practice is influenced by social context as much as damage to and loss of housing stock.

Sociological research

Bolin (1985) and Bolin and Stanford (1991) examine aspects of sheltering, housing and reconstruction in Californian communities affected by earthquakes in the 1980s. Their general observations are made from a sociological perspective.

Bolin and Stanford (1991:32) conclude:

- Natural disasters tend to magnify pre-disaster social trends, particularly those relating to the levels of inequality in the society…
- Protracted emergency periods, particularly where victims are in temporary mass shelters for extended periods, have the greatest potential for conflict to emerge over relief programs…
- The pressure from victims to respond rapidly to housing needs and to reconstruct in ways that are familiar to them may limit the amount of rational planning for reconstruction that takes place…
- In responding to the recovery needs of an ethnically, socio-economically, and demographically, diverse population, the effectiveness of a program will be improved by involving local citizen groups in coalition with government and private disaster organizations…
- Post-disaster consensus will be short-lived in communities in which pre-disaster class divisions are pronounced…
- Earthquakes are more likely than other disasters to affect economically disadvantaged persons negatively due to class based differences in housing type, quality, and location.'

Econometric research

Comerio (1997, 1998) documents housing problems following the 1994 Northridge earthquake, the 1989 Loma Prieta earthquake, and the 1989 and 1992 hurricanes, Hugo and Andrew, as well as the 1985 Mexico City and 1995 Kobe earthquakes.

She identifies the costs of repair and replacement of housing as a responsibility to be carried by individuals. While governments should still progress hazard mitigation through planning regulations and building codes for example, their main role would be as underwriters working with private insurers (except in cases of low-income households) and not as financiers.

However, an insensitivity to the differences, vulnerabilities and needs of the least well-off risks entrenching disadvantage with ghetto-isation (Hoffman, 1999). Governments should work with insurers (conducting hazard assessment and providing tax incentives for housing construction and insurance), but insurance industry practices also need examination.

Comerio (1997:177) identifies 'housing policy lessons' as follows:

- 'Damage to residential stock constitutes the majority of damage.
- The major structural damage commands media attention and often frames government response, but it is the minor damage that costs the most to repair.
- Just as we have learned that there is a surprising amount of redundancy in the transportation infrastructure, so too is there redundancy in the housing stock.
- Governments have made significant advances in improving emergency response but there has been little preparation for the much bigger task of coordinating and paying for post-disaster rebuilding.

- Private insurance is, and will continue to be, the primary fund source for private rebuilding.
- To maintain a functioning insurance market, governments need to improve loss estimation and rate setting models and to increase the level of research into the links between specific building designs, appropriate mitigation and retrofit steps and reconstruction costs.
- Government rebuilding programs need to be more efficient and targeted to complement rather than substitute for insurance coverage.
- Mitigation policies and programs must be viewed as part of the funding for recovery and not simply as disaster preparedness.'

Comerio (2004) also notes that governments could learn from large corporations and institutions about effective disaster mitigation. Innovative responses to risk include more flexible arrangements through financial incentives, tax credits, and partnerships with insurance and banking sectors, replacing currently limited regulatory models.

Most recent research

The most recent disaster research on housing issues comes in the wake of hurricane Katrina. Researchers support the types of findings above but with useful additions.

Nigg et al. (2006) focus on shelter and temporary housing but note that these needs developed both pre- and post-disaster. In particular, they suggest that:

- Emergency shelters should be identified in preparation as safe refuges, avoid the potential to become dangerous sites themselves which in turn need to be evacuated as disasters worsen, and have the capacities to staff, provision and manage evacuees numbering thousands not just hundreds.
- Neighbouring regions also need to plan to act as 'receptor states' for evacuees and have policies and agreements in place which lessen the confusion and uncertainty about the financial consequences of disasters.
- A federal approach to disaster management must fit state and local political systems, requiring greater intergovernmental coordination and communication.

Levine et al. (2007) note that full recovery does not quickly or easily follow the response phase in disaster management and that long-term, long-distance displacement and associated problems persist. They recommend:

- more holistic, long-term and regional approaches to disaster planning because multiple governance structures are not well coordinated, and policy and procedures are fragmented
- addressing gaps in the roles and responsibilities of the three stakeholder types in recovery and reconstruction (emergency managers; developers, planners, engineers, and public works and building officials; and NGOs)
- developing knowledge of how temporary displacement and housing provision relates to local land development issues (available sustainable locations, affordable zoned land, adequate infrastructure)
- identifying provision of appropriate types of accommodation, and how to effect timely transitions with multiple agencies, planners and policy-makers, and
- avoiding good policies being thwarted by trying to house people too quickly, a lack of capacity for re-building, land and housing market pressures, and inadequate employment opportunities for evacuees.

Overview

Overseas disaster research indicates several lessons relevant to housing. They relate to differences in the types of shelter and housing and their provision; the provision of adequate preparation; the roles of government at all levels and other organisations, and the networks between them; the importance of socio-economic differences in disaster vulnerability; the importance of the insurance and construction sectors, planners and developers; the problems limiting reconstruction and transition to full recovery; and the complexities of population displacement. They are therefore also highly relevant to Australian SHAs (Figure 9).

Figure 9: Summary of lessons for SHAs in natural disaster management

Phase	***SHA specific features***
Mitigation	SHA housing in low-risk areas; appropriate zoning, planning and building regulations; construct to best standards; SHA tenants informed/assisted; sensitivity to socio-economic differences in vulnerability; effective hazard assessment, warning and communication systems; innovative insurance.
Preparedness	Appropriate policies and procedures, continuous planning cycles and regular training exercises; links to all tiers of government, its agencies and other organisations; information provided to tenants and other households; community involvement; inventory of emergency shelters & accommodation with proper capacity, resources and staff.
Response	Evacuation/transport suitable for young families, disabled, elderly, pets and personal affects; adequate provision of the best types of temporary to long-term accommodation/rental assistance; proper coordination/communication across government, its agencies and other organisations; optimise key role of volunteers and emergent actors; extend local-regional network of support.
Recovery	Damage assessment, maintenance contracts, repairs and reconstruction; capacity to locate displaced populations close to social networks and places of education/employment; include the community as well as planners and developers in reconstruction; understand land and housing markets; rebuild differently in better locations and implement mitigation measures.

3 CONTEMPORARY AUSTRALIAN POLICY AND PRACTICE

This section summarises the current arrangements that exist for preparing and responding to disasters in Australia. It explains the Commonwealth, state and territory governments' organisational policies, and identifies the relevant SHAs and their roles.

3.1 Commonwealth Government

The Commonwealth Government provides a lead in the planning and response to disaster management. Its strategies are part of the responsibilities of the Attorney-General's Department. While the states and territories are each responsible for planning and responding to emergencies in their own jurisdictions, they can also apply to the Commonwealth Government for additional resources and funding as needed. It undertakes the following tasks through its central agency Emergency Management Australia (EMA) and coordinated through the National Emergency Management Coordination Centre (NEMCC):

- maintaining the national strategic disaster management policy known as the Commonwealth Government Disaster Response Plan (COMDISPLAN)
- alerting communities to meteorological and geological hazards through its disaster information network and portal (AusDIN)
- supporting scientific research through bodies such as Geoscience Australia and the Bureau of Meteorology
- coordinating training and education in disaster management practices
- maintaining an inventory of government lands and buildings that can be converted for emergency purposes such as military facilities
- providing financial resources and operational assistance for mitigation, response and recovery, and
- coordinating Natural Disaster Relief and Recovery Arrangements (NDRRA), and Natural Disaster, Regional Flood and Bushfire Mitigation Programs.

3.2 State and territory roles

Since the 1980s, Australian states and territories have passed legislation to establish emergency management structures. Each state and territory government is responsible for developing policies and practices relevant in their jurisdictions, and including warning systems, education, response and recovery, and support and direction to local government agencies.

Local government agencies are involved in the development of risk assessment and emergency planning/mitigation. However, the extent of their involvement depends on the kind of disaster, the specific arrangements with the state or territory government and the size of the agency. There are currently 770 local government municipalities with populations that range from a few thousand to over three-quarters of a million. There are also areas of Australia with very low population densities and all services in these areas are provided by state or territory agencies (Gabriel, 2003:74).

Current arrangements in each state and territory including the roles of SHAs are summarised below.

3.2.1 New South Wales (NSW)

The NSW State Emergency and Rescue Management (SERM) Act (1989) provides the legislative basis for coordinating emergency preparedness, response and recovery operations. It allows for preparing a State Disaster Plan (DISPLAN) and coordination protocols; establishing emergency management committees at state, district and local levels; and arranging the control of emergency operations.

The SHA is Housing New South Wales (HNSW), which is the largest public landlord in Australia and currently manages 146,000 properties. HNSW's Natural Disaster Response Plan (NDRP) is currently under development in accordance with DISPLAN protocols. It will detail the working relationships between HNSW and the other emergency and management response organisations.

Current practice requires specific HNSW staff to be assigned roles when emergencies are declared and to offer assistance as required. As well as providing support to public housing tenants (temporary accommodation, financial assistance) HNSW will, if deemed necessary, provide initial help for others such as homeowners and private renters. For low-income households that are not public housing tenants, HNSW has established arrangements with welfare staff employed by the Seventh Day Adventist Church (as stated in the NSW Disaster Welfare Services Plan) to coordinate accommodation arrangements should they be needed.

HNSW is also represented on intergovernmental natural disaster response groups including the state disaster recovery committee and the major evacuation centre welfare services group.

3.2.2 Queensland

Disaster management is undertaken through the Queensland Management Disaster System which operates at state, district and local levels. At each level, there is a committee structure supported by a disaster coordination centre. The committees have a dual role in both preparing for disasters and then, in their event, coordinating a response. Procedures are set out in the state's Disaster Management Act (2003).

At the local level, local government officers in each of the state's 23 districts are responsible for implementing a local disaster management plan and, when necessary, can access additional support from the district disaster coordinator. In the event of the district resource centre not having sufficient resources, requests are forwarded to the state government committees for extra support.

Queensland's housing authority is situated within the State Government's Department of Housing (DoH). The department currently employs over 1,200 people and manages and/or funds over 65,000 social housing rental units. The Department of Housing has responsibility for the delivery of specific community recovery services under the State Government's Disaster Recovery arrangements, including: information provision; contribution to community recovery centres; outreach services; and accommodation.

The department's Director-General is a permanent adviser to the Queensland Government's State Disaster Management Group, and other senior departmental staffs are members of the State Community Recovery Committee and a number of District Disaster Management Groups.

When category five tropical Cyclone Larry crossed the Far North Queensland coast on 20 March 2006, the Department of Housing responded to a range of housing issues affecting the wider community. Close to 900 people in 265 households affected by the crisis were provided with emergency accommodation.

The department worked closely with other Government agencies to assess damage to social housing rental units and commenced repairs to damaged properties. The post-cyclone recovery efforts saw the department implement accommodation solutions, such as:

- using existing buildings, in particular, a former nurses' quarters which was redeveloped to provide emergency accommodation
- providing a demountable building for the community to use
- providing funds to community organisations to assist those families unable to return to their homes
- relocating multi-room transportable dwellings for use by workers and members of the community to provide temporary accommodation.

3.2.3 Victoria

Victoria's disaster arrangements are the responsibility of the Victoria Emergency Management Council. Within state government, the Department of Human Services (DHS) is the primary agency for recovery coordination and has produced state and regional/municipal emergency recovery plans. Within each region, there are community support and recovery procedures to assist householders who have been displaced from their properties as a result of bushfires or other natural disasters. Usually, following natural disasters, targeted responses are put in train in accordance with the agreed recovery plans. In practice, recovery coordination entails a partnership arrangement between different agencies, and their arrangements are reviewed after any significant emergency event (Victorian Government, 2005).

The Office of Housing (OoH) is located within the DHS and responsible for managing 77,000 properties. Its role in recovery services includes the provision of temporary accommodation arrangements, community support and material aid. The DHS organises multi-agency training and scenario-based planning exercises to test the arrangements for emergencies.

In terms of preparing for environmental emergencies, OoH has a role in the regional/municipal emergency planning meetings that are responsible for preparing agencies in the event of an emergency or disaster.

The OoH has an important role in responding to emergencies and is responsible, for example, for providing mobile units of accommodation. It also has an emergency branch with 15 emergency recovery managers working across the state.

3.2.4 Western Australia (WA)

In WA emergency management arrangements are the prime responsibility of the Fire and Emergency Services Authority (FESA). Under the state's Emergency Management Act (2005), a State Emergency Management Committee (SEMC) is the peak body whose initial role is to define the emergency event, advise government and coordinate resources. SEMC is chaired by the state's Commissioner for Police with FESA's Chief Executive Officer acting as its deputy. The committee has representatives from a range of government agencies.

The Department of Housing and Works (DHW) is a large department employing approximately 1,300 staff. It has a large asset base and manages around 39,000 housing properties throughout the state. Through its significant works functions, the department also manages an extensive capital works program where it constructs, manages and maintains non-residential government buildings and infrastructure in WA including schools, hospital facilities, police stations and sporting facilities.

DHW does not routinely participate in SEMC meetings. In most cases DHW's regional managers are members of their respective local emergency management committees and district emergency management committees.

With responsibilities across government for public housing, construction, maintenance and management of government-owned infrastructure, the DHW has a significant role particularly in disaster recovery. It can also assist with the emergency accommodation of public housing tenants and other households forced to evacuate in the case of an extreme event. With an extensive contractor network across the state, the DHW can facilitate the engagement of contractors to carry out emergency maintenance and repair works made necessary with frequent cyclones and bushfires.

DHW has recently prepared a draft emergency management plan that is awaiting corporate executive consideration. Once approved, it will provide detailed guidelines and procedures for DHW staff in planning for and managing emergencies. Until this plan is formalised, emergency management is effected through the local and district emergency committee structures.

A major issue in WA is the turnover of staff affecting local knowledge and experience. While frontline and local emergency workers are able to use their experience, it is now recognised that overall planning mechanisms are necessary to preserve institutional knowledge. At the very least, this requires the SHA to ensure effective promulgation of DHW emergency management arrangements to all staff. Holding practice-based events and training sessions assist staff to be well prepared to respond to environmental emergencies. The new plan will assist in helping staff disseminate and maintain institutional knowledge.

3.2.5 South Australia (SA)

In South Australia, the government's disaster planning and response policies are set out in the state's Emergency Management Act (2004). The primary committee is the Emergency Management Council chaired by the Premier and including ministers with responsibility for the police, transport, health, emergency services and state-local government relations as well as the Attorney-General. It oversees the work of the state emergency sub-committee, the mitigation advisory group, response advisory group, and state recovery committee.

When emergencies occur, lead government agencies with specific expertise adopt a leadership role as 'hazard leaders'. The hazard leader for severe weather is the SA State Emergency Service (SES); for floods it is the Department of Water, Land and Biodiversity Conservation. When an incident or emergency occurs, a state crisis centre is established to orchestrate staff and support workers. SA is divided into nine emergency management zones, while Adelaide itself is divided into three zones.

The SHA is Housing South Australia, located within the Department for Families and Communities (DFC). It currently manages 47,000 properties across the state. The Chief Executive of DFC is the state disaster recovery coordinator and chairperson of the standing State Disaster Recovery Sub-Committee which adopts a whole-of-government scope in terms of preparative and responsive actions. The State Disaster Recovery Sub-Committee organises training courses, recovery exercises mentoring, planning reviews, and shared recovery protocols.

Housing South Australia, because of its location within the DFC, has an important role in disaster management. When emergencies such as bushfires do occur, it has a responsibility for re-housing public housing tenants and, if necessary, providing advice for private renters and other low-income households affected.

3.2.6 Tasmania

The Tasmanian Government's role in emergency planning and recovery is set out in the state's Emergency Management Act (2006). Similar to other states, the planning process for disasters and emergencies operate at different tiers. Overall coordination is the responsibility the State Disaster Committee. Depending on the scale of the risk or nature of the emergency, implementation issues are coordinated by regional disaster groups or municipal emergency management committees. In terms of recovery, the state government has regional recovery committees made up of the key service providers and local government representatives.

The Department of Health and Human Services (DHHS) maintains its own emergency management protocols. During an emergency or disaster, DHHS is responsible for providing temporary accommodation, casualty treatment, financial assistance and personal support services. Fire management and urban search and rescue are the responsibility of the Tasmanian Fire Service. In addition, DHHS provides membership to a number of local, regional and state committees involved in emergency planning and management. These committees report to the State Emergency Management Committee. Within the DHSS the position of Coordinator Emergency Management is responsible for the coordination of its provision of services and support.

Within DHHS, Housing Tasmania has 11,500 public housing assets. In a disaster, it assists with emergency accommodation. Area managers are on Regional Recovery Committees and participate in annual regional recovery exercises. Other Housing Tasmania staff may participate in these exercises as required. Area managers convene yearly Emergency Housing Working Group meetings. The role of Housing Tasmania is mobilised through the Regional Recovery Coordinator when a local council has reached its capacity to respond to needs in a recovery incident. Individual positions specifically created include a Coordinator Emergency Housing, an Assistant Coordinator Emergency Housing, and two Administrative Assistants. Their nominal allocation varies with the scope of the recovery incident and capacity of response. The recovery needs may vary and a flexible response is required to manage this changing need.

Local government authorities are responsible for maintaining up-to-date information on accommodation available in their municipality, and provide Municipal Emergency Plans on the Internet.

3.2.7 Australian Capital Territory (ACT)

The ACT differs from other jurisdictions in that it does not have local councils. In practice, this means that any disaster is the immediate responsibility of the territory government. Like the states, it has established emergency response arrangements and a Community Recovery Plan that identifies the roles of various agencies in responding to the recovery aspects of a disaster. ACT government plans are based on an 'all hazards' approach which means that it does not identify a separate emergency response plan for natural disasters (although, there are specific plans for chemical, biological, radiological, nuclear and health-related incidents).

The territory's SHA is Housing ACT, which sits inside the Department of Disability Housing and Community Services. It currently manages 10,700 public housing properties in the ACT. Under the ACT Community Recovery Plan, Housing ACT has a role in assisting with the procurement of immediate and more long-term housing. Following the 2003 Canberra bushfires, a special determination was made to establish a new temporary priority category for the allocation of public housing so as to assist Housing ACT in this role. The ACT government also established a Recovery Taskforce that was responsible for overseeing all aspects of the recovery to ensure

that a holistic approach was employed. A recovery centre was established, including community services, planning and land management agencies, and with the involvement of environmental and other NGOs among others.

Interestingly, Housing ACT and Community Recovery (together) are still liaising with tenants who resided in the rural villages that were almost completely destroyed during the bushfires. One village has just been rebuilt and another is under construction. Many of the houses that were destroyed in the 2003 bushfires were public housing and assisting those tenants to re-establish has been a long-term project for both Housing ACT and Community Recovery.

Under the ACT Emergency Plan and the Administrative Arrangements Orders, the Department of Disability, Housing and Community Services is responsible for community recovery. As Housing ACT sits inside this same department, there are close links between the housing aspects of recovery and the other community related issues, and Housing ACT immediately becomes involved in the response.

3.2.8 Northern Territory (NT)

The Northern Territory Disaster Act (1982) provides the basis for planning and responding to emergencies at territory, regional, and local levels. Its structure includes a Counter-Disaster Council; Disaster Controllers; and the territory's Emergency Services (NTES). Membership of the Counter-Disaster Council includes the territory's Disaster Controller, the Director of NTES, and three other appointees. The Council's role is to provide strategic advice on disaster and emergency planning and response.

The Disaster Controller is the Commissioner of Police and his/her role in respect of disaster management is to oversee the work of NTES in areas such as planning, training and operational support. It is the primary agency for implementing counter-disaster planning, training and operational support, and responsible for training, communications and public awareness programs.

The NT is divided into regions, each with a regional Controller (normally the senior police officer in the region) and a Counter-Disaster Planning Committee. Within each of the regions are localities usually led by the officer-in-charge at the local police station. He or she reports to the local Counter-Disaster Controller and the Chairperson of the local Counter-Disaster Planning Committee. In the more populated areas, representatives from the municipal councils (Darwin, Palmerston, Katherine, Tennant Creek and Alice Springs) are also engaged in local community Counter-Disaster Planning Committees and the provision of resources during response operations.

The SHA, Territory Housing, is located within the Department of Local Government, Housing and Sport (DLGHS). Since July 2008, Territory Housing has taken over responsibility for public housing in remote communities. It is now responsible for over 10,000 properties. Its role in emergencies is to provide shelter and accommodation as required. The Chief Executive DLGHS is a member of the NT Counter-Disaster Council. Territory Housing is also a member of the Emergency Shelter and Welfare sub-groups which are two of the specialist response groups constituted under the emergency management arrangements.

The major role for Territory Housing in disaster and emergency management is assisting with response and recovery mostly in relation to cyclones and floods. While there is some preparation made if appropriate notice is available, the limited staff numbers mean that work is generally restricted to the assessment and rectification of damage to public housing assets. Other functions such as tenancy management also take account of the peculiarities and extent of any disaster situation and manage them accordingly.

4 NEXT STEPS

4.1 Gaps in knowledge

This Positioning Paper has provided: an overview of the key issues associated with preparing for and responding to natural disasters; the definitions and key terms in disaster management; a review of international literature and specific case studies to identify lessons that can be learnt; and a summary of current practices in each state and territory.

Much of the policy literature identified is prescriptive in that it seeks to advance rational, comprehensive and managerial responses to natural disasters. However, a significant gap in knowledge remains, particularly in relation to the experience of SHA staff. This 'insider' knowledge gained through practical experience rarely features in the literature but it should provide a rich source of data on the challenges and conflicts that arise when organisations attempt to implement their planning protocols and procedures.

4.2 Methodology

The next stage of the project will address this gap by collecting data from practitioners and policy officers involved in disaster management, and from housing tenants who have been adversely affected by a natural disaster. The research team will undertake three case studies comprising the Canberra bushfires (2003), Cyclone Larry in Far North Queensland (2006) and coastal storms and floods in NSW (2007). These events incorporate a set of different contexts and challenges but represent the locations and types of disaster that are most relevant to Australia.

The data will be collected from 12 interviews with key professional decision-makers and two focus groups (one group comprising operational staff and the other group comprising tenants affected by disasters/emergencies) in each of the three case studies. The arrangements for the collection of data in each of the case studies will be made in advance of our visits to the ACT, NSW and Queensland. We will draw upon the expertise of local staff in each of these locations to determine the precise arrangements. However, decisions as to who will be selected for interviews and focus groups will be made in consultation with senior housing officers in each location to ensure a wide range of viewpoints and experiences. Interviews and focus group meetings will be digitally recorded to ensure an accurate capture of data. The interviews will encompass three thematic areas: experiences and lessons from the past; planning protocols; and responding to disasters.

Experiences and lessons from the past

From the perspective of SHAs: What lessons can be learnt from previous responses to natural disasters and environmental emergencies in Australia and abroad?

Planning protocols

What is the most appropriate role for SHAs in preparing for natural disasters and environmental emergencies?

What are the organisational and budgetary issues that need to be addressed in planning a natural disaster and environmental emergency response?

How can SHAs provide practical assistance to tenants to help households prepare for a natural disaster or environmental emergency?

What is the appropriate network of organisational relationships that SHAs need to forge with other agencies in the preparation for such events?

Responding to disasters

What are the most effective ways that SHAs can respond when housing is affected by natural disasters and environmental emergencies (both in the immediate and longer term period)?

What are the networks and command structures that are best suited to natural disaster and environmental emergency responses?

What are the most significant constraints that impact upon responses and how can these be minimised?

What are the most appropriate financial mechanisms for SHAs to enable an effective response?

The three thematic areas (experiences and lessons from the past, planning protocols and disaster responses) set out above will be used to organise the interview and focus group material, alongside the data already collected for the Positioning Paper. It is envisaged that the Final Report will be structured around these three themes.

CONCLUSION

This Positioning Paper has provided background information and research guidelines for a project that explores how SHAs can prepare for and respond to natural disasters. Specifically it has:

- documented the significant risks posed by natural disasters and other environmental emergencies in Australia and the complex issues that arise in devising policies to minimise their impacts and to respond in their aftermath
- estimated, by using published data, the incidence and impacts of natural disasters in Australia. Currently, an average of eight natural disasters with a cost of over $10 million and as many as 50 smaller environmental emergencies occur each year with total economic costs estimated in 1999 terms at $1.14 billion (BTE, 2001)
- noted how such events are more likely to occur in the future because of predicted increases in population and a shifting demography and location. Climate change has the potential to accentuate risks variously across Australia -- overall highlighting the importance of housing issues and the roles of SHAs
- provided definitions of the key concepts deployed and of key terms, including the most significant hazards of floods, storms, cyclones and bushfires (as most costly or lethal in Australia) as well as earthquakes, landslides and tsunamis
- identified latest international policy and practice in mitigation, preparedness, response, and recovery. Subject to refinement, new tools include greater use of risk management and insurance, new technologies for warning systems, revised building codes and land-use planning. Current good practice emphasises continuous planning and preparedness that incorporates different agencies rather than the imposition of formal command structures
- summarised the housing issues to emerge in three case studies (hurricane Katrina in New Orleans, US, 2005; summer floods in Midlands, UK, 2007; and the Hanshin earthquake in Kobe, Japan, 1995) showing how authorities responded and the nature of problems they encountered. The lessons learned from these case studies and other disasters were varied. The most recent research suggests successful responses require broad, political mobilisation and resources rather than simple adherence to a preordained planning document
- outlined current arrangements for disaster management in each state and territory. Current practice entails a multi-tiered approach that incorporates the Commonwealth, state or territory, and local governments as well as regions/districts that have operational meaning during and following a major national emergency. SHA roles vary from providing specific support to public housing tenants to a much wider remit that can incorporate all households
- set out the next stages in the research project that will entail three Australian case studies (Canberra bushfires, 2003, Cyclone Larry in Queensland, 2006; NSW floods, 2007). Each case study will collect data from interview and focus groups with practitioners, policy officers and tenants to gather a more nuanced understanding of the issues that arise for SHAs.

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